and to make rules for each class of estates. Considering, however, that all these lands are free of rights, and that the arrangements now in progress are to be permanent, it appears that, as regards their legal status, there should be no difference, and that they should all be notified as Reserves under any Regulation that may be adopted. This done, they can be allotted from time to time for any of the above-mentioned purposes for which they may be required. This arrangement, if adopted, will have the advantage that none of the areas can be alienated without the previous sanction of Government, and that no rights can be acquired in them. At the same time, by amalgamating Chapters III. and IV. of the draft Regulation, all the essential provisions made in the latter of these two chapters can, under the authority of the Resident, be extended to any of the reserves. To classify the reserves once for all, and to notify them in the Official Gazette accordingly, would make the working of the areas very inelastic. The reserves, in the wider sense, are all for the supply of the requirements of the people of the country, and they should be so utilized as to be most useful to them, with due regard to the production of a revenue from these estates to the State. This, however, can best be accomplished by adopting the suggestion now made.

ORGANIZATION.

8. The present organization is as follows :—

(1) The State Reserves are all managed by the Forest Department.

(2) The District Reserves are managed by the Deputy Commissioners.

(3) The Unreserved Forests are managed partly by the Deputy Commissioners and partly by the Forest Department.

The result is, as may easily be understood, a curious mixture. Some correspondence has lately taken place with a view of entrusting the Forest Department with the management of all the waste lands, but to bring the Forest Officers at the same time into a definite official relationship with the Deputy Commissioners. At present the forests under the management of the Forest Department have been arranged into three Divisions. It has now been suggested to form five Forest Divisions, four of which would contain the forests in one district each, and the fifth would extend over the Akola and Buldana Districts. After a careful consideration of the subject, the best arrangement would seem to be to adopt one and the same system of management for all the areas. At the same time, each Deputy Commissionership should be formed into a forest charge, with a District Forest Officer in each, or six charges in all. As regards the areas, there are only two cases in which slight difficulties might arise. One of these is that the present Ghatbori Reserve is situated in three districts, Akola, Buldana, and Basim. The greater portion, however, is situated in Akola, and moreover the whole area drains into that district, and there should be no difficulty in assigning this reserve to the Akola District for all administrative purposes. The second case is that a small area (nine square miles), though situated in the Akola District, forms part of the Melghat Range; this area could easily remain under the administration of the Melghat Forest Officer.

9. An important item is, of course, the additional expenditure. At present the superior staff consists of—

Conservator of Forests			1
Deputy and Assistant Conservators		3	
Sub-Assistant Conservator		1	
		—	4
Total ...			5

An additional superior officer has repeatedly been asked for, and I believe this increase must be sanctioned at an early date, if the present organization remains in force. The average pay of Deputy and Assistant Conservators under the existing organization is Rs. 575 per mensem, and if, instead of one such officer, three Sub-Assistant Conservators are appointed, the expenditure will be virtually the same. Possibly the junior Sub-Assistant Conservator might be appointed

on Rs. 150 per mensem, in which case a saving of Rs. 25 per mensem would be effected. There would then be the following staff :—

Conservator of Forests ...	...	...	1
Deputy and Assistant Conservators	...	...	3
Sub-Assistant Conservators	...	...	4
		—	7
	Total	...	8

The three Deputy and Assistant Conservators should receive charge of the most important districts, namely, Ellichpur, Wun, and probably Basim ; while the three senior Sub-Assistants would receive charge of the forests in Amraoti, Akola, and Buldana. The junior Sub-Assistant would be attached to the Ellichpur District, where the work is too heavy for one officer, and he would thus have a good opportunity to qualify for the charge of a Forest District. The charge of the Conservator of Forests in the Hyderabad Assigned Districts is small, and he will be able to work out the programme of work in each forest charge in full detail; hence there should be no risk in appointing Sub-Assistants, who will ordinarily be Natives of India, to the charge of the forests in three of the districts.

10. The official relationship between the Deputy Commissioner and the District Forest Officer can be effected in various ways. In the Introduction to the Review, by the Inspector General of Forests, of the Forest Administration in India for the year 1880-81 a short history of the case has been given. In paragraphs 4 to 10 of that Review a description of the system as finally elaborated by Mr. Brandis for the Madras Presidency will be found. Under this system the District Forest Officer and his staff hold charge of all forests, whether reserved or otherwise, in the district, and they are directly subordinate to the Deputy Commissioner. On matters of ordinary routine the Deputy Commissioner will authorize the District Forest Officer to issue orders without reference to him; other matters will be referred to the Deputy Commissioner by means of office notes. The District Forest Officer will draw up a diary of all business, and send it at the close of each week to the Deputy Commissioner, who, after recording any remarks or instructions he may think fit, will send it on for the Conservator's information, and that Officer will return it, noting any remarks or suggestions he may have to offer. It will then go back to the District Forest Officer, the Deputy Commissioner, if he disagrees with the Conservator's remarks, informing the District Forest Officer, so as to guard against action being taken of which he disapproves. In this way the Deputy Commissioner will have full executive power, while the functions of the Conservator in regard to the current work are mainly those of advice. On the other hand, the control of the departmental finance and organization will rest with the Conservator. The finance will be regulated by the annual budget. In connection with it, *annual plans of operations for each district* will be drawn up by the District Forest Officer and agreed upon by the Deputy Commissioner and the Conservator. If they differ as to the budget and plan of operations, it will be for the Commissioner or the Resident to pass final orders. The appointment, posting, promotion, and dismissal of Forest Rangers and Foresters should rest with the Conservator, while that of Forest Guards will rest with the District Forest Officer under the orders of the Deputy Commissioner. In this manner the Conservator will exercise the needful control in professional matters, and maintain a proper continuity of action, while, on the other hand, the Deputy Commissioner watches over the executive work in his district.

A modified system is in force in the Central Provinces, under which the District Forest Officers, who are in charge of the first and second class reserves, are subordinate to the Conservator as regards the first class reserves, and to the Deputy Commissioner as regards the second class reserves.

A third system has been adopted in the North-Western Provinces and Oudh and in Assam. Under it the District Forest Officer is made subordinate to the Collector, but his correspondence is arranged in two classes: that referring to accounts, establishments, and a few other subjects is sent direct to

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the Conservator of Forests, while that on all other subjects is submitted by the District Forest Officer to the Collector, who forwards it to the Conservator.

11. I am not prepared to say which of these systems should be adopted in Berar; but as a matter of fact the differences are not of very great importance. On the whole, I am in favour of the system as elaborated by Mr. Brandis for Madras, with such modifications as experience may show to be required in Berar. In practice the Deputy Commissioner will probably authorize the District Forest Officer to correspond direct with the Conservator on certain matters, keeping him informed of what is going on by means of the weekly diary, while on others he will direct him to send the correspondence through him. Practice would no doubt soon reduce the system to a workable shape.

12. There remains then to consider how the three Sub-Assistants are to be obtained. Mr. Drysdale has no men at present fit for such appointments. Under these circumstances, enquiries might be made whether the Government of the North-Western Provinces and Oudh can spare one or two men who have received a professional training; and if this is not possible, it will be necessary to train men for the appointments. The new organization can, therefore, only be completed when the necessary men become available. With a view of always having in future men fit to fill any vacancy amongst the Sub-Assistants, it should be laid down that all Forest Rangers employed hereafter in Berar should be men who have obtained their professional training at the Central Forest School at Dehra Dun, in accordance with the conditions laid down in the Rules circulated with the Government of India Resolution No. 15 F., dated the 1st December 1881.

CHAPTER II.—SPECIAL.

13. As already stated in the Introduction to these Suggestions, my stay in the Hyderabad Assigned Districts extended over only 17 days, during which I saw the Amraoti Hill Reserve, the Loni Babul Ban, and the Melghat Reserves. Regarding the two former I have no special remarks to offer at present; but if I should be able to visit South Berar hereafter, I shall no doubt refer to them again.

The Melghat.

14. A full and detailed description of the Melghat forests will be found at pages 4 to 23 of Mr. Brandis' Report on the Hyderabad Assigned Districts of 1878. Since that was written various changes have taken place, and further progress has been made, which I shall now proceed to record.

Area.

15. The total area of the Melghat reserved and unreserved forests is estimated to amount to 1,546 square miles, the details being as follow :—

	Square miles.
Bairagarh Reserve	425
Gugamal „	180
Chikalda „	4
Total Reserves ...	609
Unreserved forests	937
Grand Total ...	1,546

The Bairagarh State Reserve was demarcated in 1866 by Lieutenant (now Major) Mackenzie. The Gugamal Reserve was first established as a District

Reserve, but in 1878 it was reduced to its present size and put on the same footing as the Bairagarh Reserve. The two areas form in reality one continuous block, covering an area of 605 square miles. The Chikalda Reserve was demarcated in 1880, for the purpose of securing an adequate supply of wood and grass for the station of Chikalda. It is under protection against fire and the cutting of green timber, while dry wood and grass may be removed without payment. I need not refer to it again.

It was proposed by Mr. Brandis in 1878 that an additional reserve, comprising about 50 square miles, should be formed in the vicinity of Jiri, with the view of bringing the anjan forests (*Hardwickia binata*) in that locality under conservancy; but, owing to the difficulty of providing grazing for the people in the vicinity, the Resident has up to date not accorded his sanction to the formation of the reserve. Mr. Drysdale does not consider the matter of much importance, as the reserves in South Berar already include an area of about 80 square miles containing anjan.

With the exception of some distance on the north and east, where the Bairagarh Reserve adjoins the Central Provinces, the unreserved forests form a ring around the reserves, the bulk of the area being, however, situated to the west and south. And again, an outer ring is formed by a series of nakas, where the royalty, or selling price, on all produce exported from the forests is collected.

Cultivation.

16. Both the reserved and unreserved forests are intersected by cultivation. According to the Census of 1881, the total population inside the forests amounts to 42,655, of whom about three-fourths are Kurkus and Gonds. Dhya cultivation has been stopped in the Melghat for a number of years past. The number of people living in the reserves is given in the following statement:—

Name of Reserve.	No. of villages.	No. of houses.	No. of inhabitants.	Head of cattle.
Bairagarh	19	668	3,968	4,414
Gugamal	5	40	232	386
Total ...	24	708	4,200	4,800

With a view to concentrate in certain localities the cultivation scattered over the reserves, nine black soil villages have been established in Bairagarh and four in Gugamal, in which the people are encouraged to settle. In this way the number of villages, which five years ago amounted to 57 in Bairagarh, has been reduced to 19, and it is hoped that this number will in course of time be reduced to 9. The thirteen black soil villages are now being surveyed, and their area cannot yet be given; but it is believed that it will not exceed 70 square miles, so that the area remaining under forest amounts to 535 square miles. Within the areas assigned to these villages the people cultivate, provide themselves with forest produce, and graze their cattle, but they are not allowed to cut teak without the previous sanction of the Forest Officer, and if they export produce they are subject to the same conditions as outsiders.

Communications.

17. Mr. Brandis, in his Report, explained in detail in what directions the produce of the Melghat forests is exported, and the information given by him need not be repeated here. He also refers to the roads required to make the forests accessible. Since then considerable progress has been made in the

construction of carting roads, and up to date the following have been completed :—

By the Department of Public Works.

		Miles.	
(1.)	From Ellichpur to Pili, metalled	32	
(2.)	From Gattang to Chikalda, unmetalled	15	
		—	47

By the Forest Department.

(3.)	Chikalda to Bandam, unmetalled, about	25	
(4.)	Pili to Kalamkar, ditto	30	
(5.)	Sembado to Hatru, ditto	24	
(6.)	Ditto to Makla, ditto	8	
		—	87
	Total ...		134

It is proposed to construct in the immediate future the following roads :—

By the Department of Public Works.

(7.)	Ellichpur to Chikalda, commenced	18	
(8.)	Jiri to Kalamkar, under survey, about	35	
(9.)	Kaso, *viâ* Mondra, to Malua, do.	30	
		—	83

By the Forest Department.

(10.)	Hatru to Biba	12	
(11.)	Ditto to Mota	12	
(12.)	Raipur to Patia	20	
(13.)	Chikalda to Sembado	12	
(14.)	Makla, *viâ* Jarida, to Biba	25	
(15.)	Pili, *viâ* Botia, Malua, Soso, and Butuda, to Butram ...	25	
(16.)	Raipur to Awagar	20	
(17.)	Kolkaz to Arao	12	
		—	138
	Total ...		221
	Grand Total ...		355

Of this number, 130 miles under the Department of Public Works will be main lines of export, while 225 miles will be feeder roads constructed by the Forest Department.

18. It is stated that the Forest Department roads cost, everything included, under Rs. 400 per mile; and if an annual grant of Rs. 10,000 is sanctioned, it will be possible to complete the net-work here sketched in about 10 years, including current repairs. I have past over a large portion of the roads so far constructed, and I found that the work has been done in a most satisfactory manner. The roads are well laid out, and the forest roads are certainly very cheap for the money. Mr. Ballantine, the Officer in charge of the Division, has the work in full swing, and it would be a great pity not to take advantage of the present favourable circumstances to extend the works as indicated above. As to the necessity of constructing these roads, that has, I think, been acknowledged. The increase in the export of bamboos alone during the last 12 months due to the construction of roads amounts to about 1,100,000, representing an increase in the revenue of Rs. 11,000. An increase is also beginning to show in the export of timber, and under these circumstances I trust that, for the next 10 years, an annual grant of Rs. 10,000 for the construction of additional roads may be sanctioned.

Fire Protection.

19. A commencement in fire protection was made in 1870, by protecting the Raipur block in the Bairagarh Reserve. Beginning from 1872 the whole Bairagarh Reserve was taken under protection, and subsequently the Gugamal Reserve was added. The system of protection is as follows :—

Fifty miles of the exterior boundary are natural features, rivers, which do not require special measures. The remaining parts of the boundary,

measuring 135 miles, are burnt in November, and in addition 259 miles of interior lines, chiefly along lines of communications, are burnt to a width of 200 feet. During the dangerous season special fire watchers are entertained, who, in addition to the regular staff, patrol all these lines.

The results during the last 10 years may be seen from the following statement:—

Year.	Area burnt, in square miles.		
	Bairagarh (area = 425).	Gugamal (area = 180).	Total (area = 605).
1872-73	45	Not protected.	45
1873-74	25		25
1874-75	25		25
1875-76	25		25
1876-77	.....		.....
Total of 5 years	120	.....	120
Average per year	24	.....	24
Per cent. of total area	5·6	.....	5·6
1877-78	6	.....	6
1878-79	1	2	3
1879-80	2	.....	2
1880-81	1	.....	1
1881-82	15	1	16
Total of 5 years	25	3	28
Average per year	5	0·6	5·6
Per cent. of total area	1·2	0·3	0·9

It will be observed that the success during the last five years has been almost complete. The only extensive fire which occurred during that period, and which spread over 15 square miles, is said to have been caused by lightning in a somewhat remote part of the forest, where it ran over a considerable area before it was noticed.

The expenditure under the head of fire protection during the year 1881-82 amounted to Rs. 1,896, which is at the rate of about Rs. 3 per square mile. On the whole these results are very satisfactory, and they are due—

(1) to the compact shape of the reserves;

(2) to the excellent control exercised by Mr. Ballantine; and

(3) to the fact that the people in the reserves are happy and contented.

Wherever similar conditions exist, fire protection may safely be expected to be successful.

20. As regards the effect of fire protection on the forest growth, I have satisfied myself that it is all that can be desired. In the better parts of the reserves, especially in the ravines and on the lower banks, the poles and saplings have made good growth, and large numbers of seedlings have sprung up. In the poorer parts of the reserves, especially on many plateaux and ridges, the effect has been less marked. But here the rock appears generally close to the surface, and the first condition for successful forest growth—a sufficient depth of soil—does not exist, and endeavours must be made to create it, as far as this may be practicable, by continued protection from fire.

Working of the Forests.

21. The system of working the Melghat forests has, for many years past, been based on the following considerations:—

(1) to treat the reserves with a view to their improvement, and

(2) to enforce no restrictions in the unreserved forests.

Accordingly the main part of the revenue is collected by means of a system of revenue stations, or nakas, situated at the outlets all round the Melghat. Any one can cut and collect forest produce in the unreserved

forests, and on passing the naka he pays for the produce according to certain rates. The karkuns in charge of the nakas also issue passes for grazing.

The principle of non-interference in the unreserved forests has, I believe, in one instance only been departed from, when the rate due on teak bullies was raised from one anna to four annas each, with the view of reducing the number cut annually. Considering the large area included in the reserves and the immense stock of young trees growing in it, I am of opinion that no restriction need be imposed on the cutting of teak bullies outside, and I should suggest that action be taken accordingly. It is, however, a matter for consideration whether one anna is not a very low rate for a teak bully, and whether it might not be fixed at two annas.

22. Inside the reserves the working is strictly controlled by the forest staff. The principal products are bamboos and teak, but there are also large stocks of other useful trees, as :—

haldu	...	*Adina cordifolia,*
sadra	...	*Terminalia tomentosa,*
dhaura	...	*Anogeissus latifolia,*
tinnas	...	*Ougeinia dalbergioides,*
moka	...	*Schrebera swietenioides,*
lendia	...	*Lagerstroemia parviflora,*

and others; while there is a moderate stock of harra (*Terminalia Chebula*), yielding myrobalans, and a large number of mohwa trees (*Bassia latifolia*) all over the reserves.

Until quite lately only bamboos and teak were saleable; but, since the opening of the Pili road, a demand for other timber has sprung up. It is as yet small, but it will doubtless grow steadily now.

23. The export of bamboos (*Dendrocalamus strictus*) during the last six years has been as follows :—

Year.	Number exported		
	From the Reserves.	From the Unreserved forests.	Total.
1877-78	133,549	1,789,074	1,922,623
1878-79	230,000	1,402,793	1,632,793
1879-80	263,416	1,531,358	1,794,774
1880-81	556,600	1,516,800	2,073,400
1881-82	617,650	1,035,600	1,653,250
1882-83	1 519,153	1,452,023	2,971,176

The rapid increase in the export from the reserves during the last three years is due to the construction of roads, and it is evident that this increased export alone will more than pay for the outlay incurred on them. The increase is likely to keep pace with the further extension of the system of roads.

The system of cutting bamboos in the reserves is as follows :—All the people living in the reserves may cut dry bamboos for export where they like. For outsiders certain blocks only are opened every year for the cutting of dry or green bamboos. No payment is taken, except the ordinary rate levied on passing the nakas, which is at present Re. 1 per 100 bamboos.

The stock of bamboos in the reserves is by no means so large as I should like to see it, and great care should be taken to husband the supplies, by opening the several blocks for cutting in rotation and by encouraging the extension of the bamboo-producing area when seed years occur. The cutting of bamboos for fodder is now strictly prohibited inside and outside the

reserves, and this restriction must, in the interest of the people in the plains, on no account be relaxed.

24. The cutting of timber in the reserves has since their formation been restricted to the cutting back of badly-grown teak. In this way 107,000 trees were cut flush with the ground between the years 1871 and 1876, and since then 10,906 trees have been added. The material thus obtained realized Rs. 16,058-3-10, against an expenditure of Rs. 868-4-3 on account of cutting, leaving a surplus on the operations of Rs. 15,189-15-7. The results as regards the re-growth are everything that can be desired. By far the larger number of stumps have sent up healthy and vigorous straight shoots, which will yield valuable timber hereafter. I am of opinion that these cuttings, which have been greatly reduced of late years, should be considerably extended as far as there is a demand for the material. In frost localities care should, however, be taken to leave sufficient growth on the ground to protect the young shoots against damage by frost.

In connection with this, the cutting out of other trees should be considered, especially in cases where the young shoots of teak are likely to be injured or interfered with by other trees. The cutting out of trees other than teak should ordinarily be made so as to encourage a proper proportion of teak on the ground; but where the material is unsaleable it may often be advisable to let a tree remain standing for a while, until a demand arises for it.

Sowing and Planting.

25. In his Report of 1878 Mr. Brandis describes the systems of sowing and planting followed in the Bairagarh Reserve up to that date. They were cultivation by transplants, and sowing in T shaped notches. In addition Mr. Brandis recommended the system of sowing in lines 30 or 33 feet apart, with seed patches in the lines from 3 to 5 feet apart. Experiments were also made in other ways; but the above are the three chief methods followed. Up to date the following areas have been sown and planted in the Bairagarh Reserve:—

	Acres.
Transplants	626
Notch system	1,208
Sowing in lines	164
Total ...	1,998

Of this area, 589 acres are considered failures, and the rest is distributed as follows:—

	Acres.
Teak	961
Teak and bamboos	447
Bamboos	1
Total ...	1,409

26. The information collected on my late tour confirms on the whole the opinion expressed by Mr. Brandis in paragraph 59 of his Report of 1878. The chief enemies of these plantations are frost and rats; but I believe frost does really more harm than the rats. The latter attack only individual plants, which they no doubt kill, but those remaining have a chance of growing up. Frost, on the other hand, in exposed localities cuts all plants down year after year. I have examined some localities which were planted 10 years ago, and they are now just as bare as they were in 1872, except that a certain number of teak plants go on vegetating, but are cut down by frost every year. It is impossible to say for how many years more this struggle will continue.

Fortunately all the plantations are not situated in frost localities. Those along the lower parts of slopes with a certain amount of cover have done very

well, and have produced fine healthy saplings. As to the future, I am of opinion that the sowing and planting of teak should be continued, but only favourable localities should be selected for the purpose. Frost localities should be avoided unless there is some shelter on the ground to protect the seedlings against the effects of frost; moreover, only localities with a fair soil should be chosen. Where these conditions are wanting it is better not to attempt the raising of teak, until continued fire protection has effected a change. There will be any amount of suitable soil to operate upon for years to come.

The system to be followed should be that of sowing or planting in lines, but care should be taken to guard against producing pure teak; hence the lines should be at least 30 feet apart, and I have no objection to the distance being increased to 50 feet.

The planting and sowing of bamboos should, next to teak, receive special attention. The amount of bamboos available, though more than the present demand, will not be sufficient to meet all the requirements of North Berar, when the system of roads described above has been completed. Bamboos are an article upon which the comfort of the people depends to a very great extent, and it is our duty to meet all demands, as far as this is practicable. The localities most suited for teak are generally also those best adapted for bamboos, and these two species should continue to be planted together. They are both articles of trade, and the bamboos will, in addition, greatly assist the teak to attain a large size and a fine shape.

Cutting of Creepers.

27. Creepers are only bad in certain localities. Up to date the following areas have been cleared of them :—

	Square miles.
In 1878-79	... 12
In 1879-80	... ...
In 1880-81	... 27
In 1881-82	... 33
Total	... 72

It is intended to continue this work steadily every year, each Forester being required to clear a certain area per annum. The creepers are severed close to the ground, and then a piece about 4 feet long is cut out altogether.

Establishments.

28. The establishment entertained for the unreserved forests consists of four Foresters on Rs. 15 each, whose chief business is to prevent dhya cultivation and the cutting of bamboos for fodder. The naka establishment remains pretty much as it stood at the time of Mr. Brandis' visit; it is under the control of Mr. Rasul Khan, Sub-Assistant Conservator.

The establishment of the Bairagarh and Gugamal Reserves is as follows :—

	Bairagarh.	Gugamal.	Total.
	Rs.	Rs.	Rs.
Forest Rangers...	1 on 100	1 on 80	2 costing 180
Foresters	1 on 35	.....	1 „ 35
Ditto	2 on 25	1 on 25	3 „ 75
Ditto	3 on 15	1 on 15	4 „ 60
Forest Guards	3 on 12	3 on 12	6 „ 72
Ditto	12 on 8	7 on 8	19 „ 152
Karkun	1 on 15	.....	1 „ 15
		Total ...	... 589 per mensem.

This represents an expenditure of Rs. 7,068 per annum, which is at the rate of Rs. 12 per square mile of reserved forests. As far as I had an opportunity of observing, the subordinate staff do their duty in a very efficient manner, and the men present a smart appearance. I do not think I have seen better guarded reserves than those in the Melghat anywhere in India. Probably one of the chief reasons is that the lowest paid man gets more pay than he can earn as an ordinary labourer. It was quite pleasing to see the *esprit de corps* which has been established.

The present allotment of the area amongst the two Ranges is very unequal. While the Bairagarh Ranger has a Range of 425 square miles, the Gugamal Ranger has only 180 square miles to look after, and it would, at first sight, appear that the charges should be re-arranged. I am, however, of opinion that matters had better remain as they are for the present, as the Bairagarh Ranger has a sufficient staff of Foresters to assist him. Hereafter, when the working of the reserves has been extended, it will probably become advisable to divide the Bairagarh Reserve into two Ranges.

Financial Results.

29. The financial results up to 1877-78 are given in Mr. Brandis' Report. Since then they have been as follow :—

Year.	Reserved forests.			Unreserved forests.			Total.		
	Receipts.	Charges.	Deficit.	Receipts.	Charges.	Surplus.	Receipts.	Charges.	Surplus.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1878-79 ...	4,806	21,001	—16,195	1,17,449	31,447	86,002	1,22,255	52,448	69,807
1879-80 ...	7,311	25,794	—18,483	1,28,467	31,471	96,996	1,35,778	57,265	78,513
1880-81 ...	8,905	25,378	—16,473	1,02,164	34,562	67,602	1,11,069	59,940	51,129
1881-82 ...	11,517	37,704	—26,187	82,666	27,254	55,412	94,183	64,958	29,225
1882-83 ...	22,388	31,731	— 9,343	1,03,321	35,883	67,438	1,25,709	67,614	58,095
Average ...	10,985	28,322	—17,337	1,06,813	32,123	74,690	1,17,798	60,445	57,353

The reserves have hitherto been worked with a deficit; but, as the revenue is now rapidly rising, a surplus may soon be expected. On the whole, the receipts are fluctuating. The decided falling-off in 1881-82 is ascribed chiefly to the check put on the cutting of teak bullies in the unreserved forests. The total revenue of 1882-83 is above the average of the last five years. If the road works are continued, and the royalty on teak bullies from the unreserved forests is reduced from four to two annas, the revenue seems likely to rise considerably beyond that hitherto realized.

The expenditure has risen considerably during the last five years, and it will be necessary to keep a good check on it in future. The surplus of 1882-83 is, however, slightly above the average of the last five years.

On the whole, the Melghat forests are very valuable estates, which deserve, and will well repay, all the care bestowed upon them. When the growth of bamboos has been extended, and the comparatively young teak is further advanced in age, the surplus which can be derived from these forests should be much larger than that hitherto realized.

Head-quarters of Officers.

30. Formerly the head-quarters of the Divisional Officer were at Chikalda, but they have, a short time ago, been removed to Ellichpur. The latter is some distance from the forests, while the former is in the middle of them. As the Forest Department owns two houses at Chikalda, I am strongly of opinion that the Divisional Officer's head-quarters should, as soon as practicable, be moved back to it. The Officer will be much more accessible to the

subordinate staff, and he will be able to exercise a much more efficient control, than if stationed at Ellichpur.

31. It is also for consideration whether the Conservator's permanent head-quarters should not be established at Chikalda. During the winter he travels over the different districts, and it would probably be an advantage if he spent a considerable part of the summer in the Melghat, which contains by far the most important forests in Berar. This would not prevent his seeing the Commissioner, as the latter spends several months in each year at Chikalda; and if the Conservator is required at Amraoti at any other time, he can easily run down in about forty-eight hours.

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SUGGESTIONS

REGARDING

FOREST ADMINISTRATION

IN THE

CENTRAL PROVINCES.

BY

W. SCHLICH, PH. D.,

INSPECTOR GENERAL OF FORESTS TO THE GOVERNMENT OF INDIA.

Dated the 1st June 1883.

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INTRODUCTION.

A LARGE store of information regarding Forest Administration in the Central Provinces is recorded in the Annual Administration Reports of that province. In addition, Mr. Brandis, late Inspector General of Forests to the Government of India, after a tour of inspection in the province, wrote a letter addressed to the Conservator of Forests, No. 85, dated the 9th April 1869, in which he dealt with the various branches of forest work. Mr. Brandis visited the Central Provinces again in the spring of 1876, when he wrote his "Suggestions regarding Forest Administration in the Central Provinces," dated the 17th April 1876. He proceeded a third time to the Central Provinces in 1876-77, but he did not publish the information then collected. He has, however, left a series of papers, then drawn up, some of which will be found appended to the present Report.

2. In accordance with instructions received from the Government of India, I proceeded to the Central Provinces in December 1882, and arrived at Jubbulpore on the 17th of that month. Here I met Major Doveton, the Conservator of Forests, and in his company I marched through the Mandla, Balaghat, Seoni, and Nagpur Districts to Nagpur, seeing on the way the Lower Gour, Barela, Jagmandal, Banjar, Pandratola, and Satpura first-class reserves, and as many second-class reserves as came in my way. From Nagpur I proceeded by rail to Warora, and thence to the Moharli first-class reserve. From Moharli I marched through a series of second-class reserves to Ahiri, where I examined the Ahiri first-class reserves and the adjoining forest lands which had been offered for sale to Government by the Ahiri Zamindar.

From Ahiri I proceeded to Berar, and I re-entered the Central Provinces at Jaora, on the Tapti river, whence I marched through the Khamapur, Kalibhit, Rajaborari, Saoligarh, Bowergarh, and Bori first-class reserves, arriving at Pachmarhi on the 8th March 1883.

3.* It will be observed from the above remarks that I have seen only a portion of the forests in the Central Provinces; but I believe the areas visited are fairly representative of the whole, and I have been able to augment my personal observations, not only by the information derived from the literature on the subject, but also, and I may say principally, by that communicated to me by Major Doveton, who has, with a short interruption, been the Conservator of Forests in the province since 1868, and who is most intimately acquainted

with the forests under his charge. I had also the pleasure of meeting the following Forest Officers during my tour :—

In Mandla	...	...	Captain Losack,
In Seoni	...	...	Mr. Jacob,
At Nagpur	...	...	Messrs. Rind, Moore, and Fowler,
In Chanda	...	...	Mr. Thomas,
In Betul	...	...	Mr. King,
In Hoshangabad	...	...	Colonel Jarrett, and
At Pachmarhi	...	...	Mr. Thompson,

to all of whom I am indebted for information on various subjects.

Although I believe that I have thus acquired a fair knowledge of forest matters in the Central Provinces, I hesitate to enter, in these Suggestions, into the minute details of the administration, which will more appropriately be dealt with by the local officers. On the other hand, I may be able to do some good by looking at the system of forest management in the province from a general point of view, by summing up what has been done so far, and by adding such suggestions as may occur to me. Guided by these considerations, I propose to arrange my remarks, after giving a short sketch of the forests and their usefulness, under the following few heads :—

(1) Area and Boundaries.
(2) Organization.
(3) Protection, especially against Fire.
(4) Cultural Operations.
(5) Working of the Forests.
(6) Financial Results.

CHAPTER I.—GENERAL.

1. Sketch of the Forests.

General.

4. Although it is not intended to give in this place a detailed description of the Central Provinces, it will be useful to recapitulate a few facts.

The Central Provinces are situated between the 17th and 25th degrees of northern latitude, and they cover an area of 113,279 square miles, of which 84,445 are British territory and 28,834 Feudatory States. The population amounts, according to the Census of 1881, to 11,548,511 people, of whom 9,838,791 live in British territory and 1,709,720 in the Feudatory States.

5. Along the centre of the province, almost from east to west, runs the Satpura range or table-land, which divides the province into two parts. To the north of the Satpuras, and nearly parallel with them, flows the Nerbudda river, which empties its waters into the Gulf of Cambay, and to the north of that river is found the Vindhyan table-land, the waters from which join the Ganges. To the south of the Satpuras is found the valley of the Wainganga, which river takes in the Wardha and runs in a southerly direction into the Godavari and then into the Bay of Bengal. The Chhattisgarh Division, in the east, is drained by the Mahanadi, which runs into the Bay of Bengal near Cuttack.

Although considerable stretches of level ground are found along the valleys of the rivers, the Central Provinces are, on the whole, pre-eminently a country of hills and table-lands. Of the geological formations, those most characteristic are the Vindhyans and Trap, and the changes of soil and vegetation are very rapid and marked in most parts of the province, from the rich black cotton soil to the lightest sand.

6. Only about one-fourth of the area has been brought under cultivation, the more level and better pieces having been selected for this purpose. The remaining three-fourths are covered with forest and scrub jungle, or

they form grazing lands and blanks. In considering the ultimate distribution of the permanent forest estates, the configuration shortly indicated above must be taken into account. While the valleys and more level parts will be chiefly brought under cultivation, the bulk of the State Reserves will be situated in the Satpuras, on the Vindhyan table-land, on the hills between the Wardha and Wainganga, and on those to the east of the Wainganga.

7. The forests are of various quality, depending on the conditions under which they have grown up. The finest forests are no doubt found in the southern and eastern parts of the province, where the conditions of soil and the limited population are most favourable for the development of a healthy forest growth. In some of the central and northern districts, on the other hand, they have been sadly reduced by injudicious cuttings and by temporary cultivation ; but, on the whole, the province is as yet very rich in forests, although large timber has disappeared from vast areas.

8. The character of the forests is almost throughout that of a mixed forest, in which bamboos form, as a rule, a prominent feature. Every change of soil or sub-soil brings a change in the composition of the forest, and it would require an elaborate classification to indicate all those changes. There are, however, not counting the bamboo forest as a separate class, the following five types, which deserve to be specially mentioned.

Teak Forest.

9. Teak appears on almost all geological formations, but chiefly on trap, sandstone, and granite as in Chanda, Bowergarh, and Chhattisgarh. As elsewhere, it thrives best on a moderately stiff loam with free sub-soil drainage, such as results from the decomposition of trap. Here it attains its largest dimensions ; but it is also found on less favourable soils, the result of the decomposition of sandstone, and on laterite. Accordingly, the size which teak reaches varies considerably in different localities and under different circumstances. While Ahiri produces fine large teak trees, over 100 feet high, some of the northern districts produce chiefly teak of a moderate height, sometimes even less than 50 feet high. The forests are well stocked in some parts, and more or less open in others, according to circumstances, and this depends, to a considerable extent, on the greater or less abundance of bamboos. In Ahiri, for instance, teak, bamboos, and other trees form a very dense forest ; whereas, in other parts again, the forests are more open.

The principal companions of teak are :—

Bamboo *(Dendrocalamus strictus)*.
Terminalia tomentosa.
„ *bellerica.*
Pterocarpus Marsupium.
Ougeinia dalbergioides.
Dalbergia latifolia.
Dalbergia paniculata.
Lebidieropsis orbicularis.
Anogeissus latifolia.
Bassia latifolia.
Odina Wodier.
Buchanania latifolia.
Diospyros Wightiana.
Stephegyne parvifolia.
Adina cordifolia.
Briedelia retusa.
Albizzia odoratissima.
Casearia tomentosa.

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In the south-eastern parts of the province the following species must be added :—

Schleichera trijuga.
Xylia dolabriformis.
Stereospermum chelonoides.
Dillenia pentagyna.

Teak is more generally found in the Central Provinces than any other tree. It forms an essential part of the forests throughout the Satpuras and Vindhyans; it is less frequent in the Maikal range of hills, though occurring in Mandla and Balaghat. It is found throughout Bhandara and Chanda.

Sal Forest.

10. The sal tree is gregarious, and it requires a well drained sub-soil. A light loam or sandy clay suits it best. Its chief companions are :—

Anogeissus latifolia.
Terminalia tomentosa.
„ *bellerica.*
„ *Chebula.*
Gardenia resinifera.
„ *latifolia.*
Albizzia odoratissima.
Nyctanthes Arbor-tristis.

The principal sal forests are found in Jubbulpore, Mandla, the Pachmarhi hills, in Raipur east of the Mahanadi, Bilaspur, and Sambalpur.

Bija Forest.

11. Bija, or bijasal *(Pterocarpus Marsupium)*, likes a free sandy soil, and the localities where it is found are rarely traversed by water channels, the rain water being at once absorbed into the soil.

The principal companions of bija are :—

Phyllanthus Emblica,
Odina Wodier,
Bombax malabaricum,
Saccopetalum tomentosum,
Acacia Catechu,
Zizyphus xylopyra,
„ *œnoplia,*
Flacourtia Ramontchi,
Xylia dolabriformis,
Lebidieropsis orbicularis,
Dalbergia paniculata,
Anogeissus latifolia,
Chloroxylon Swietenia,
Cochlospermum gossypium, and
Bamboos.

The bija forests appear chiefly in the southern part of the Central Provinces.

Anjan Forest.

12. These forests are found on freely drained soils, especially on drift gravel beds.